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NOTES ON GEOGRAPHIC DISTRIBUTION

Distribution extension of *Escherbothrium molinae* Berman and Brooks, 1994 (Cestoda: Tetraphyllidea: Triloculariidae) in *Urotrygon* sp. from the Pacific Coast of Mexico

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ABSTRACT: Cestodes collected from the spiral valves of the stingray *Urotrygon* sp. from the Pacific coast of Mexico were identified as *Escherbothrium molinae* Berman and Brooks, 1994. The first report of the species was from the Gulf of Nicoya and the Guanacaste coast, Costa Rica; this work represents the second report of the species since the original description and extends its distribution north to Acapulco, Guerrero, Mexico.

Escherbothrium molinae was described by Berman and Brooks (1994) based on 35 specimens taken from several individuals of *Urotrygon chilensis* (Günther, 1871) (Chondrichthyes: Myliobatiformes: Urolophidae), the Chilean round ray, collected in the Gulf of Nicoya and the Guanacaste coast, Costa Rica. Since that date the species has been mentioned in publications by Brooks and Barriga (1995), Brooks *et al.* (1999), and Caira *et al.* (1999), among others, but it has not been reported again.

As part of a continuing study of the helminth parasites of stingrays of the Acapulco and Jalisco, nine stingrays (*Urotrygon* sp.) were collected from waters off Bahía de Chamela, Jalisco, Mexico (19°31' N; 105°04' W) (three in July 2001 and six in January 2004); five specimens of *U. munda* from Golfo de Santa Elena, Playa Cuajiniquil, Costa Rica (10°57' N, 85°48' W) (February 1996); and 34 stingrays (*Urotrygon* sp.) from Bahía de Acapulco, Guerrero (16°50' N; 99°53' W) (October 2012) by local fishermen. Individual stingrays were maintained on ice until examined and the intestinal tract removed and examined according to (Monks *et al.* 1996). Ectohelminths and endohelminths were fixed and then transferred to 70% ethyl alcohol. Three stingrays (July 2001) and three of the 34 stingrays (October 2012) were infected with eight specimens of *E. molinae*. Worms were stained using Delafield's hematoxylin or Mayer's carmalum, cleared in Methyl Salicylate, and mounted in Canada balsam for examination as whole mounts. Voucher specimens were deposited in the Colección Nacional de Helmintos, IBUNAM, Mexico (CNHE-8513, CNHE-8514); and the Harold W. Manter Laboratory, University of Nebraska-Lincoln, U.S.A (HWML-49850 to HWML-49853).

In the original work, Berman and Brooks (1994), established the genus and described *E. molinae*; the name of the genus was inspired by the artwork of M. C. Escher. They examined the holotype and paratypes of *Zyxibothrium* Hayden and Campbell, 1981 and illustrations of the scolex of *Pentaloculum* Alexander, 1963, and they noted a marked similarity between the scoleces of those taxa and the bifurcating structure of the medial bothridial septa of *E. molinae*. Therefore, they placed it into the family Trilocullariidae. Others have suggested that the genus should be moved to the Rhinebothriinae, but formal taxonomic studies of this question are still wanting.

To date, the only known species of *Escherbothrium* is a parasite of elasmobranchs, *Urotrygon* sp. It has a singular type of scolex with 4 pedicellated bothridia, cup-shaped bothridia, each bothridium with apical sucker and muscular septa dividing it into 4 large and 2 small loculi (Figures 1-2). The specimens we collected conform to the description established by Berman and Brooks (1994) in this and the other features included in their description; Figures 1-2 are provided to aid in the identification of specimens.

The most often overlooked components of the biodiversity of a country are those organisms with life cycles as parasites. Unless there are health-related problems with particular species (Poulin 2004; Brooks and Hoberg 2008), only specialists are concerned about their presence or the possibility of their extinction; it is doubtful if a species of parasite will ever make the "Red List" (IUCN 2012). This is partly because the public sees parasites as diseases that must be cured rather than an indispensable part of natural systems (Brooks and McLennan 2002). This lack of emphasis has resulted in there being few reports of their distributions except in the specialized literature, and many helminths have only been reported in the original descriptions. Despite the usefulness of distribution records of parasites to our understanding of the ecology and evolution of parasites and their hosts (Brooks and McLennan 1993; Brooks and Hoberg 2000; Poulin 1999), this trend has yet to be reversed. This report of the range extension of *Escherbothrium molinae* Berman and Brooks, 1994 is offered to provide information useful for those classes of studies.

Finally, the finding of *E. molinae* in Guerrero and Jalisco, suggests that individuals of *U. chilensis* are moving (possibly migrating) within the limits of the range of

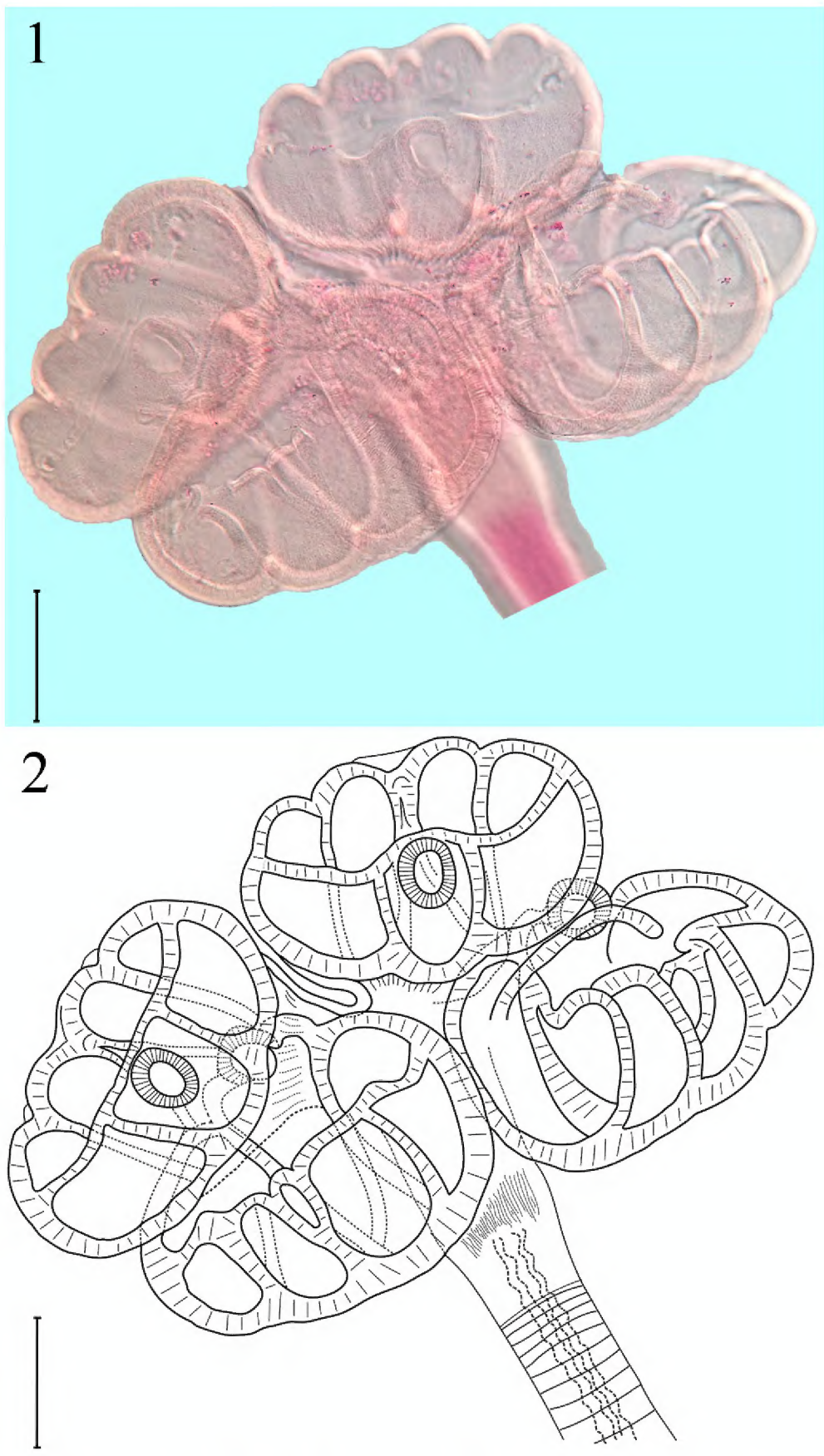

Figure 1-2. Scolex of *Escherbothrium molinae* Berman and Brooks, 1994 from *Urotrygon* sp. (Günther, 1871) from Acapulco, Guerrero, Mexico. 1. *Escherbothrium molinae*, photo. 2. *Escherbothrium molinae,* drawing. Bar = 150 μm

the species (Castro-Aguirre and Espinosa-Pérez 1996; Fishbase 2012). From this second report, and the distance between each known locality, it is obvious that further studies must be carried out for a fuller understanding of the distribution of *E. molinae*, particularly in the localities between Mexico and Costa Rica. Molecular studies could shed light on this hypothesis and provide information about the potential "passive migration" of *E. molinae*. The stingrays should also be studied with the same goal. The taxa from Mexico that are host for *E. molinae* are difficult to distinguish and assign to a particular species. Both *U. chilensis* (Günther, 1872) and *U. rogersi* (Jordan and Starks, 1895) are common along this coast, and there are occasional reports of *U. nana* Miyake and McEachran, 1988 (see Castro-Aguirre and Espinosa-Pérez 1996). The morphology (*i.e.*, coloration, etc.) of these species is variable and each is virtually indistinguishable to casual observation; assignment to species is based primarily on the form of the pupil cover of the eye (McEachran 1995; Fishbase 2012). Thus, we are relatively sure that the stingrays collected in Mexico are either *U. chilensis* or *U. rogersi* (or both species were included), but we cannot be sure beyond assigning them to *Urotrygon* sp. Both parasitological and ichthyological knowledge would benefit from a thorough study of this genus that would correlate morphology and molecular identification.

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